

Ceramic properties

Alumina

AL-995™

(MAC-A995W)

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Description

High purity alumina ceramic of **99.5% Al_2O_3** content. Its purity, chemical resistance and high temperature capabilities prove invaluable for semiconductor processing applications.

Prime features

- Electrically and dimensionally stable at high temperatures.
- Low particle generation.
- Dense, non porous and vacuum tight.
- Excellent dielectric properties.
- Accepts moly-manganese metallising for high temperature brazing of vacuum tight assemblies.
- Excellent chemical and abrasion resistance.

Typical applications

- Wafer processing and handling devices.
- Components for semiconductor process chambers, spluttering targets, fixtures, etc.
- Laser devices for wide range of industrial, medical and defence duties.
- Power tubes for klystron and x-ray equipment.
- Flow meters and pressure sensors.

Specifications

- Quality Assurance to ISO 9002.

MAC production capabilities

- Isostatic and dry pressing, green machining.
- CNC grinding and lapping to very tight tolerances.
- Metallising of components.
- High temperature brazing of assemblies.
- Prototype, batch and volume production.

Physical properties*

Color	White
Bulk density (fired), Mg/m^3 [lb/in³]	3.86 [0.139]
Porosity (apparent), %	0 (fully dense)
Rockwell hardness (R45N)	81
Compressive strength, MPa [lb/in²]	> 2070 [> 300,000]
Flexural strength, MPa [lb/in²]	310 [45,000]

Thermal conductivity, W/m.K [BTU/ft.hr. °F] @RT 29.3 [16.9]

Thermal expansion coefficient, $10^{-6}/\text{C}$ [$10^{-6}/\text{°F}$]

25-200C [77-390°F]	6.9 [3.8]
200-400C [390-750°F]	7.8 [4.3]
400-600C [750-1110°F]	8.3 [4.6]
600-800C [1110-1470°F]	9.0 [5.0]
800-1000C [1470-1830°F]	9.4 [5.2]

Maximum no-load temperature, C [°F] 1725 [3150]

Dielectric strength, dc kV/mm [V/mil] @RT 31.5 [800]

		25C	300C	500C
Dielectric constant, K^1, @	10MHz	9.58	9.92	10.20
	1000MHz	9.30	—	—
	8500MHz	9.37	9.61	9.82
Dissipation factor, $\tan \delta$, @	10MHz	0.00003	0.00009	0.00040
	1000MHz	0.00014	—	—
	8500MHz	0.00009	0.00014	0.00025
Loss factor, $K^1 \tan \delta$, @	10MHz	0.00029	0.00089	0.00408
	1000MHz	0.00130	—	—
	8500MHz	0.00084	0.00135	0.00245

Volume resistivity, ohm.cm

@ 25C [77 °F]	> 10^{14}
@ 300C [570 °F]	2.0×10^{11}
@ 600C [1110 °F]	6.0×10^8
@ 900C [1650 °F]	2.5×10^6

Te value, C [°F] > 975 [> 1790]